

The Carnegie Astrometric Planet Search Program

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We are undertaking a new search for Jupiter-like planets in orbit around nearby stars. Using the 2.5-m du Pont telescope located at Carnegie's Las Campanas Observatory in Chile, we will search for gas giant planets similar to Jupiter by the astrometric method. In this method, the wobble of the host star's position on the sky as it orbits around the center of mass of the star-planet system is measured with high accuracy. Knowing the mass of the star then allows the true mass of the planet, as well as its orbital parameters (including the semi-major axis, eccentricity, and inclination), to be determined. Our observations of the M7 cluster with the Tek5 camera on the du Pont imply that astrometric accuracies of 0.25 milliarcsec per hour may be achievable, sufficient to detect a Solar System analogue at 5 pc with a signal-to-noise ratio of 4. We are in the process of building a specialized astrometric camera, the Carnegie Astrometric Planet Search (CAPS) camera, with support from the NSF and CIW. The heart of the CAPS camera will be a Rockwell Hawaii-2RG HyViSI array, with the camera's design being optimized for high accuracy astrometry of red dwarf stars. We plan to follow at least 100 nearby (within 10 pc) low mass stars, principally M, L, and T dwarfs, for 10 years or more, in order to detect Jupiter-mass planets with orbital periods long enough to permit the existence of habitable, Earth-like planets on shorter-period orbits.